



**A GUIDANCE NOTE ON THE
BEST PRACTICABLE MEANS**

FOR

IRON AND STEEL WORKS

(INDUCTION FURNACES)

BPM 9/2

Environmental Protection Department
Air Management Group

1997

1.0 INTRODUCTION

- 1.1 This note is issued by the Environmental Protection Department as one of a series to provide guidance for processes specified under Part IV of the Air Pollution Control Ordinance (the Ordinance). It is a guide to the Department's officers in the assessment of an application for a licence under the Ordinance.
- 1.2 It should be understood that this note sets out the basic requirement for the applicant to provide and maintain the best practicable means for the prevention of the emission of air pollutants. The applicant should recognize that whether a licence is granted or refused, and on what conditions, may depend on all the circumstances of an individual application besides this note.
- 1.3 This note covers specified processes and associated processes for the melting of a ferrous metal by an induction furnace for casting, described as "Iron and Steel Works" in Schedule 1 to the Ordinance. Iron and Steel Works are works in which the installed furnace capacity exceeds 1 tonne, or, if the mode of operation is continuous, 1 tonne per hour, and in which a ferrous metal melting process for casting is carried out.

2.0 EMISSION LIMITS

- 2.1 All emissions to air, other than steam or water vapour, should be colourless, free from persistent mist or fume, and free from droplets.
- 2.2 Smoke emission from a combustion process should not, when compared in the appropriate manner with the Ringelmann Chart or an approved device, appear to be as dark as or darker than Shade 1 on the Ringelmann Chart.
- 2.3 The concentration of particulates in the emission from an induction furnace for the melting of a ferrous metal should not exceed 100 mg/m^3 , expressed at reference conditions of 0°C , 101.325 kPa and dry conditions without correction for oxygen content, and compensated for any effect of dilution air to the concentration.
- 2.4 The concentration of particulates in the emission from other processes such as casting finishing, foundry sand reclamation should not exceed 50 mg/m^3 , expressed at reference conditions of 0°C , 101.325 kPa and dry conditions without correction for oxygen content, and compensated for any effect of dilution air to the concentration.

3.0 FUEL RESTRICTION

- 3.1 Unless otherwise agreed by the Authority, fuels to be used should be conventional fuels that comply with the provisions of the Air Pollution Control (Fuel Restriction) Regulations.

4.0 CONTROL OF EMISSIONS

4.1 Emission of air pollutants should be minimised to prevent:

- (a) harm to the environment, adverse effects to human health, or creation of any nuisance situation;
- (b) threatening the attainment or maintenance of the relevant air quality objectives;
- (c) giving rise to an objectionable odour noticeable outside the premises where the process is carried on; and
- (d) imposing undue constraint on the existing and future development or land use.

4.2 To satisfy the emission limits set out in section 2.0 of this note, prevention or reduction of emissions at source is the choice. Where the emission is not able to be prevented or reduced at sources to sufficient extends to meet these requirements, air pollution control equipment should be provided.

- *Dispersion*

4.3 Chimneys include vents, structures and openings of any kind from or through which air pollutants may be emitted. The applicant will need to demonstrate that the proposed chimney will provide sufficient dispersion of air pollutants.

4.4 A chimney should be at least 3 metres above the roof of any building to which it attaches and above the roof of any adjacent buildings.

4.5 Emissions from chimneys should be directed vertically upwards and not restricted or deflected by the use of, for example, plates or rain caps.

4.6 The efflux velocity of the exhaust gas stream emitted from a chimney should not be less than 15 m/s at full load condition.

- *Materials Handling*

4.7 Handling and storage of fuel, raw material, products, wastes or by-product should be carried out in such a manner to prevent the release of:

- (a) visible dust emissions;
- (b) emissions of organic vapours; and/or
- (c) other noxious or offensive emissions.

- *Ferrous Metal Melting*

4.8 Metallic charge should be clean, uncontaminated by grease, non-ferrous metals or non-

metallic matters unless the furnace is either designed or fitted with equipment for control of emission of pollutants to the satisfaction of the Authority.

4.9 Dust laden air from equipment for the melting of scrap ferrous materials should be adequately contained and vented to a suitable equipment to meet the emission limit set out in section 2.0 of this note.

4.10 Enclosed furnaces, casting, ductwork and ancillary equipment should be made and maintained as gas-tight as is practicable. Emissions from charging operations should be prevented by careful selection of scrap and its introduction to the furnace. Local exhaust ventilation should be provided to vent the emissions to suitable arrestment plant to meet the emission limit set out in section 2.0 of this note.

- *Casting Finishing and 'Knock Out' Processes*

4.11 Mechanical knock-out operations should be undertaken in either a booth or area with high efficiency extraction to ensure containment and capture of dust. Emissions should be vented to suitable arrestment plant to meet the emission limit set out in section 2.0 of this note.

4.12 All casting finishing processes including grinding, shot blasting, polishing and arc air cutting should be carried out in booths or areas with extraction of emissions or using equipment incorporating built-in extraction equipment. All extraction should be vented to suitable arrestment plant to meet the emission limit set out in section 2.0 of this note.

- *Sand Mould Making and Foundry Sand Reclamation*

4.13 Mould formation, curing of mould and all mixing, crushing and reclamation of sand should be carried out in a manner to minimise air pollutant emissions. Emissions should be adequately contained and vented to suitable arrestment plant where necessary to meet the emission limit set out in section 2.0 of this note.

- *Miscellaneous*

4.14 Traffic areas, including roads and areas with regular vehicle movements, should be paved with a suitable roadway covering and be kept clean constantly by means of sweeping machines or other facilities.

4.15 External surfaces of the process building, ancillary plant and open yards and storage areas should be regularly cleaned to prevent the accumulation of dusty material in circumstances where the dust may become wind entrained. Particular attention should be paid to roofs, guttering, roadways, external storage areas and yards. Cleaning operations should be carried out by methods which minimize emissions of particulates to air, for example by vacuum cleaning, wet cleaning or other appropriate techniques.

5.0 MONITORING REQUIREMENTS

5.1 The applicant should satisfy the Authority that–

- (a) he will provide the necessary instrumentation, process controls and monitors to demonstrate that the process is being properly controlled;
- (b) the scope, manner and monitoring frequency will be sufficient to demonstrate compliance with the terms and conditions imposed to the licence at all times; and
- (c) he will have sufficient staff to service these requirements.

Results of all monitoring and inspections should be recorded in such a manner specified by the Authority. This record should be retained at the premises for a minimum of two years, or other period specified by the Authority, after the date of last entry and be made available for examination as and when required by the Authority.

5.2 Indication of the satisfactory of air pollution control equipment should be provided. For example, the pressure drop across filters should be displayed.

5.3 Ambient monitoring should be made for total suspended particulates and/or respirable suspended particulates, if required by the Authority, in such a manner and at such locations and frequency specified by the Authority.

6.0 COMMISSIONING

6.1 Commissioning trials, to be witnessed by the Authority whenever appropriate, should be conducted to demonstrate the performance and capability of the air pollution control measures. Unless otherwise agreed by the Authority, the report of the commissioning trial should be submitted to the Authority within 1 month after completion of the trial.

7.0 OPERATION AND MAINTENANCE

7.1 Best practicable means requirements include not only the provision of the appliances, but the proper operation and maintenance of equipment, its supervision when in use, and the training and supervision of properly qualified staff.

7.2 Equipment should be repaired as soon as practicable. Specific operation and maintenance requirements should be specified for individual pieces of equipment used in the specified processes.

7.3 Malfunction, breakdown or failure of any process or air pollution control equipment that may result in abnormal emission of air pollutants should be reported to the Authority by telephone or facsimile as soon as possible, followed by a written report within 3 working days after the incident.